AP78L05

5V OUTPUT 3-TERMINAL POSITIVE REGULATOR

Features

- 5.0V output voltage with tolerances of ±5% over the operating temperature ranges
- Output current in excess of 100mA
- Internal thermal overload protection
- Output transistor safe area protection
- Internal short circuit current limiting
- No external components
- Available in plastic TO92-3L and plastic SOP-8L low profile packages
- Lead Free Finish / RoHS Compliant (Note 1)
- SOP-8L: Available in "Green" Molding Compound (No Br, Sb) (Note 2)

General Description

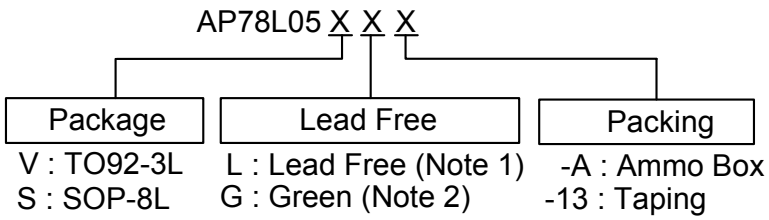
The AP78L05 is a three terminal positive regulator available with fixed output voltages. It can be used in a wide range of applications. It can provide local on-card regulation, eliminating the distribution problems associated with single point regulation. The voltages available allow the AP78L05 to be used in logic system, instrumentation, HiFi, and other solid state electronic equipments.

The AP78L05 is available in the plastic TO92-3L and SOP-8L package using industrial standard package technology. The regulator can deliver 100mA output current with adequate heat sinking. Current limiting is included to limit the peak output current to a safe value. Safe area protection for the output transistors is provided to limit internal power dissipation. Thermal overload protection is integrated to prevent the IC from overheat due to abnormal condition.

Applications

- Communication
- CD-ROM
- DVD-Player
- Set-Top Box

Ordering Information



Note: 1. TO92-3L is available in "Lead Free" product only.
2. SOP-8L is available in "Green" product only.
3. RoHS revision 13.2.2003. Glass and High Temperature Solder Exemptions Applied, see *EU Directive Annex Notes 5 and 7.*

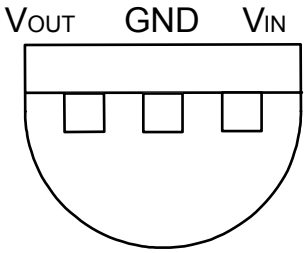
Device	Package Code	Packaging (Note 4)	Ammo Box / Tube		Tape and Reel	
			Quantity	Part Number Suffix	Quantity	Part Number Suffix
AP78L05V	V	TO92-3L	2000/Box	-A	NA	NA
AP78L05S	S	SOP-8L	NA	NA	2500/Tape & Reel	-13

Note: 4. Pad layout as shown on Diodes Inc. suggested pad layout document AP02001, which can be on our website at http://www.diodes.com/datasheets/ap02001.pdf.

Pin Assignments

(1) TO92-3L

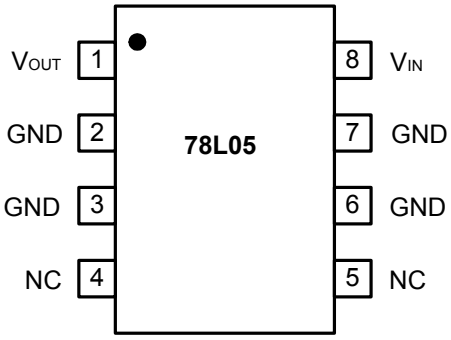
(Bottom View)



TO92-3L

(2) SOP-8L

(Top View)



SOP-8L

Pin Descriptions

Name	Description
V_{IN}	Operating Voltage Input
V_{OUT}	Voltage Output Pin
GND	Ground
NC	No Connection

Absolute Maximum Ratings

Symbol	Parameter	Rating	Unit
V_{CC}	Supply Voltage	+30	V
V_{OUT}	Output Voltage to Ground	5	V
T_{ST}	Storage Temperature	-65 to +150	°C
T_{OP}	Operating Junction Temperature	-20 to 125	°C
TMJ	Maximum Junction Temperature	150	°C

Electrical Characteristics (All Output Voltage Versions)

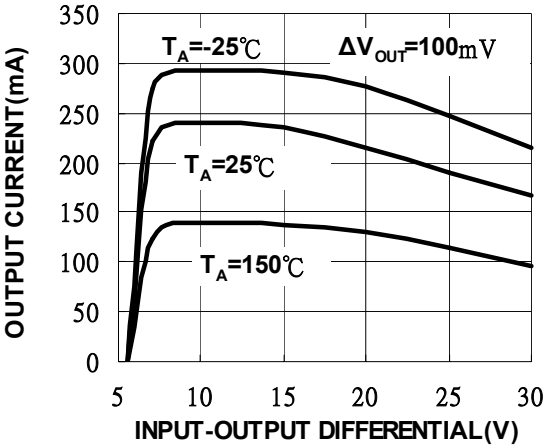
Limits in standard typeface are for T_A=25°C, **Bold typeface applies over -20°Cto 125°C for TO92-3L and SOP-8L Packages.**
Unless otherwise specified: V_{IN}=10V, I_O=40mA, C_I=0.33μF, C_O=0.1μF.

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V_O	Output Voltage		4.8	5	5.2	V
		7V≤V_{IN}≤20V 1mA≤I_O≤40mA	**4.75**		**5.25**	
		1mA≤I_O≤70mA	**4.75**		**5.25**	
ΔV_O	Line Regulation	7V≤V_{IN}≤20V		18	75	mV
		8V≤V_{IN}≤20V		10	54	
ΔV_O	Load Regulation	1mA≤I_O≤100mA		20	60	mV
		1mA≤I_O≤40mA		5	30	
I_Q	Quiescent Current			3	5	mA
ΔI_Q	Quiescent Current Change	8V≤V_{IN}≤20V			**1.0**	
		1mA≤I_O≤40mA			**0.1**	
V_n	Output Noise Voltage	f=10Hz to 100kHz (Note 5)	-	40		μV
$\Delta V_{IN}/\Delta V_{OUT}$	Ripple Rejection	f=120Hz 8V≤V_{IN}≤16V	47	62		dB
I_{PK}	Peak Output Current			140		mA
$\Delta V_O/\Delta T$	Average Output Voltage Tempco	I_O=5mA		-0.65		mV/°C
V_{IN}(Min)	Minimum Value of Input Voltage Required to Maintain Line Regulation			6.7	7	V
θ_{JA}	Thermal Resistance Junction to Ambient	TO92-3L (Note 6)		176		°C/W
		SOP-8L (Note 7)		153		
θ_{JC}	Thermal Resistance Junction to Case	TO92-3L (Note 6)		33		
		SOP-8L (Note 7)		18		

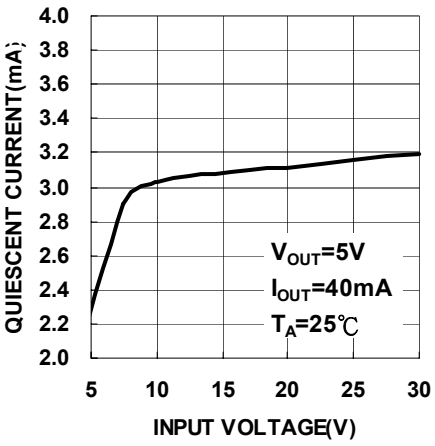
Note: 5. Recommend 0.01μF minimum load capacitance at output to suppress high frequency noise.
6. Test conditions for TO92-3L: No heat sink, no air flow.
7. Test conditions for SOP-8L: Device mounted on 2oz copper, minimum recommended pad layout, FR-4 PCB.

Typical Performance Characteristics

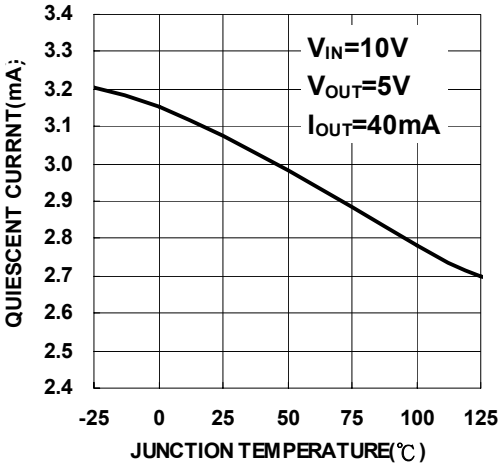
Peak Output Current



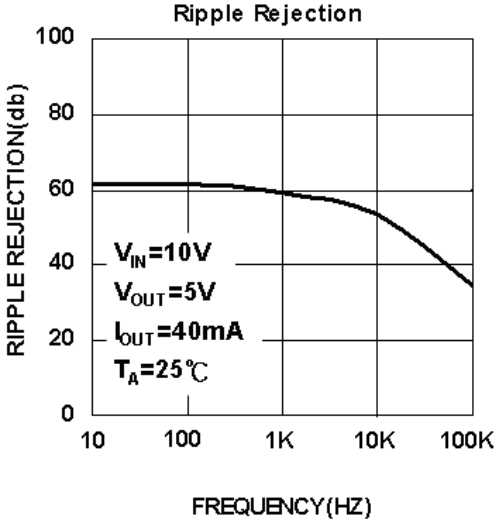
Quiescent Current



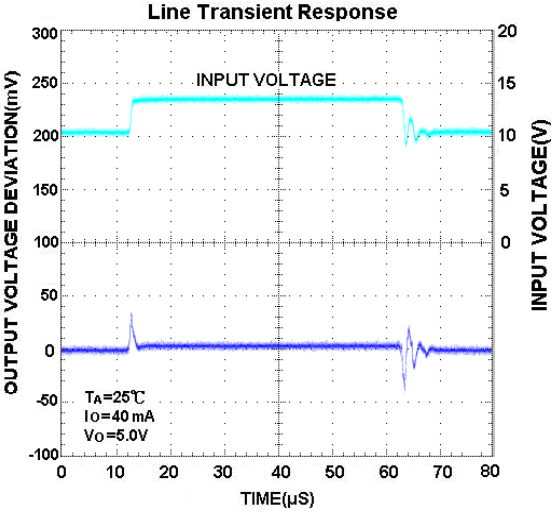
Quiescent Current



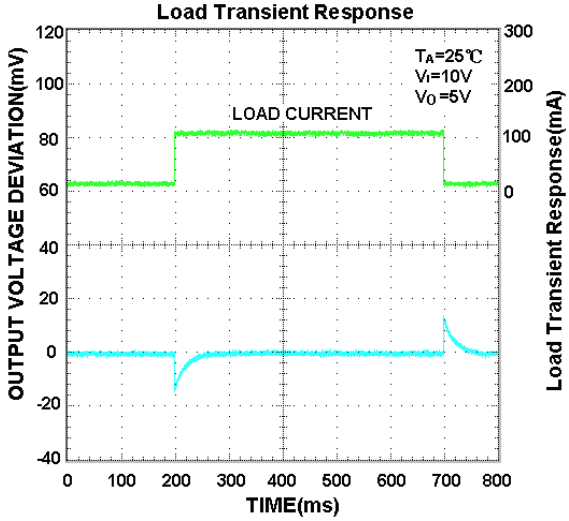
Ripple Rejection



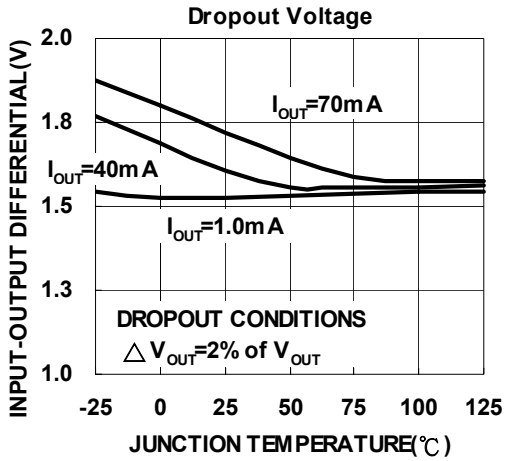
Line Transient Response



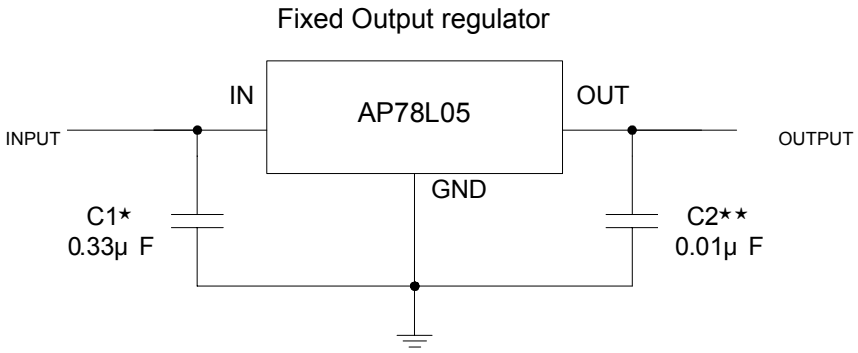
Load Transient Response



Typical Performance Characteristics (Continued)



Typical Application Circuit



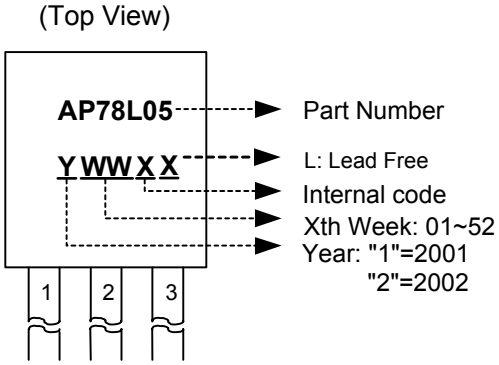
★：Required if the regulator is located more than 3" from the power supply filter.
★★：See (Note 5) in the electrical characteristics table.

Function Description

Introduction
The AP78L05 fixed-mode 5V output voltage regulator is a three terminal device. The AP78L05 fixed voltage regulator series has built-in thermal overload protection which prevents the device from being damaged due to excessive junction temperature. The regulator also contains internal short-circuit protection which limits the maximum output current, and safe-area protection for the pass transistor which reduces the short-circuit current as the voltage across the pass transistor is increased.

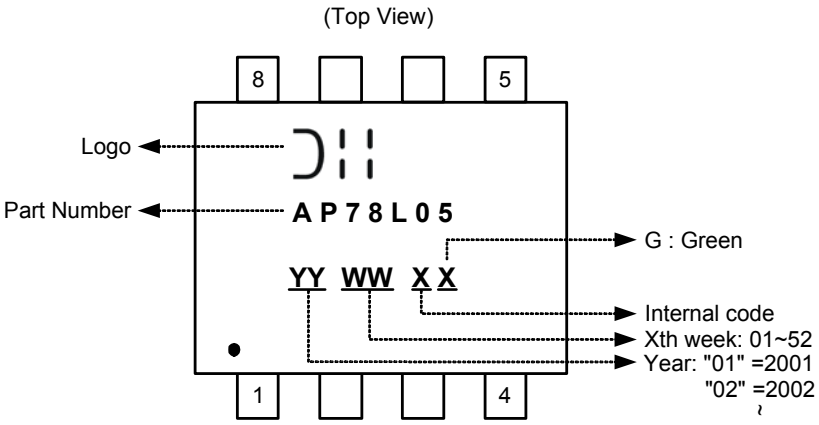
Marking Information

(1) TO92-3L



TO92-3L

(2) SOP-8L

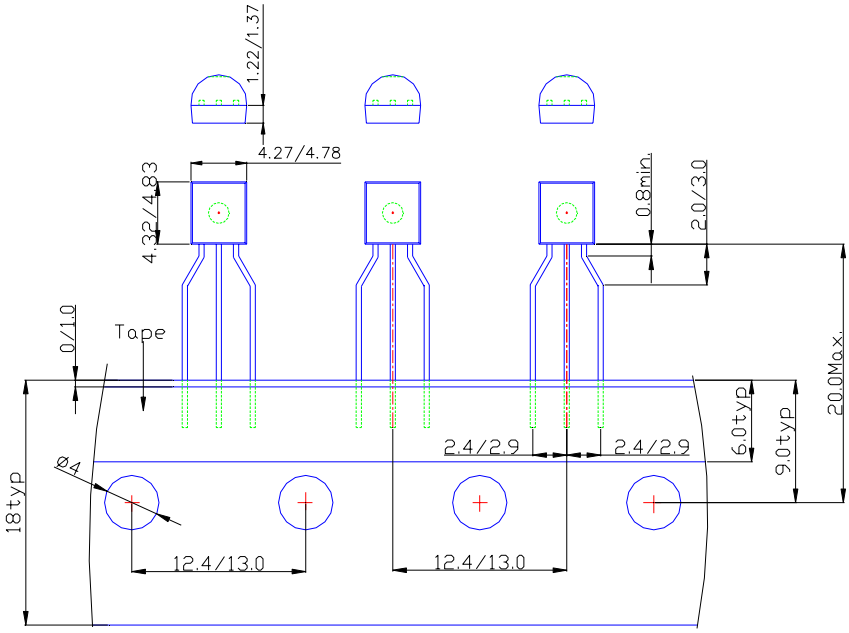


SOP-8L

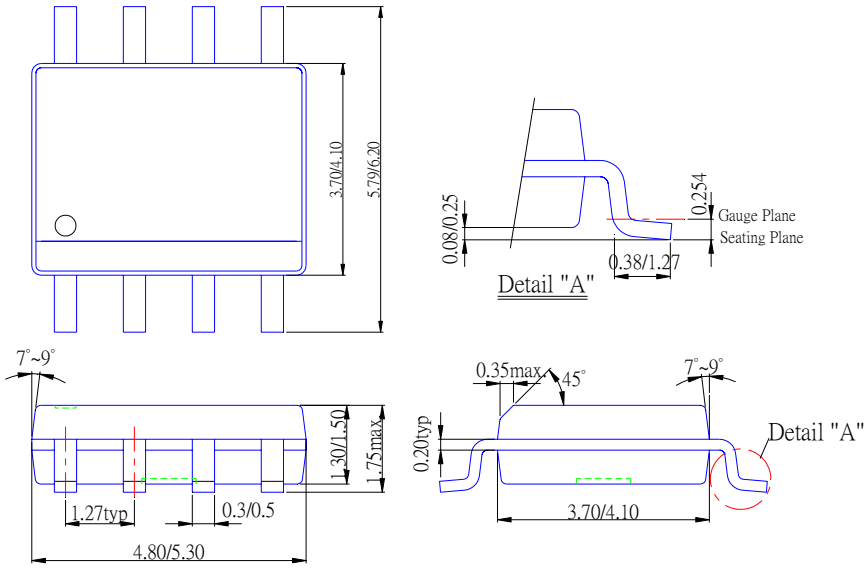
Device	Package	Identification Code
AP78L05S	SOP-8L	AP78L05

Package Information (unit: mm)

(1) Package Type: TO92-3L



(2) Package Type: SOP-8L



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